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- Plants 5–10 mm. high, seta 2–3 mm., exserted, capsule turbinate. 5. *Hookeri.*
- Plants 5–13 mm. high, seta 5–13 mm., mouth bordered by 6–8 rows.
    - Leaves acuminate, entire, lid blunt, spores .014–.021 mm., spinose. 6. *acuminatum.*
    - Leaves acute, serrate, lid rostrate, spores .040–.045 mm., warty. 7. *Drummondii.*
- Plants 20–30 mm. high, mouth bordered by 4–8 rows of cells,
    - Stems tall, leafy, branching, seta curved, spores .037–.042 mm., warty. 8. *australe.*
- Plants 5–25 mm. high, mouth bordered by 8–12 rows of cells, spores .027–.035 mm.
    - Margins serrate, cells inflated, spores spinose, annulus of two rows of cells.
        - Capsules turbinate, 1–2 mm., mouth flaring, 9. *turbinatum.*
        - Capsules pyriform, 2–3 mm., urceolate, mouth not flaring, 10. *megalocarpum.*
    - Margins entire, cells elongated, spores warty, capsules globose. 11. *Californicum.*

## The Genus Cassia in North America.[*]

By Charles Louis Pollard.

Since the publication of Bentham's monograph in 1871[†], the genus *Cassia* has received no detailed treatment. The discovery of new material in the South and Southwest during recent years renders a revision of the North American species desirable. The present paper enumerates only those forms which are known to occur north of the Mexican boundary, the numerous tropical species being reserved for later consideration. The classification into subgenera, sections and series is that of Bentham, with such modifications as seemed necessary to adapt it to North American forms exclusively.

### Analytical Key to the North American Species.

- Leaves with a spinulose rhachis, 27. *C. armata.*
- Leaves with rhachis not spinulose.
    - Leaves 2–9–foliolate.
        - Peduncles 1–flowered.
            - Leaves 2–foliolate, 2. *C. pumilio.*

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[*] Submitted to the University Faculty of Pure Science of Columbia College as partial requirement for the degree of Master of Arts.

[†] Trans. Linn. Soc. London, **27** : 503–591.

- Leaves 4–8–foliolate.
  - Leaves coriaceous, 18. *C. Greggii.*
  - Leaves not coriaceous.
    - Plant cinereous-pubescent, 17. *C. grammica.*
    - Plant glabrous, 16. *C. Wrightii.*
- Peduncles 2–many–flowered.
  - Leaves 2–foliolate.
    - Peduncles 2–flowered, 3. *C. bauhinioides.*
    - Peduncles several–flowered, 1. *C. Roemeriana.*
  - Leaves 3–9–foliolate.
    - Legume turgid, not exceeding 5 cm. in length.
      - Plant puberulent, 4. *C. crotalarioides.*
      - Plant silky-pubescent or tomentose.
        - Leaves 2–3–foliolate, 5. *C. Covesii.*
        - Leaves 4–6–foliolate, 6. *C. Lindheimeriana.*
    - Legume exceeding 5 cm.
      - Petiolar gland wanting, 14. *C. Wislizeni.*
      - Petiolar gland at base of rhachis.
        - Stipules filiform.
          - Leaves 4–6–foliolate, 8. *C. occidentalis.*
          - Leaves 6–9–foliolate, 10. C *Marylandica.*
        - Stipules linear, foliaceous.
          - Legume 20–25cm. long, 7. *C. leptocarpa.*
          - Legume 8 cm. long, 9. *C. ligustrina.*
      - Petiolar gland between lowermost pair of leaflets.
        - Leaflets obovate, 11. *C. Tora.*
        - Leaflets elliptical.
          - Peduncles 2–flowered, 13. *C. biflora.*
          - Peduncles several-flowered, 12. *C. Bahamensis.*

Leaves 6–24–foliolate.

- Plants glabrous or subglabrous.
  - Petiolar gland large, truncate, 19. *C. Chamæcrista.*
  - Petiolar gland minute, cupuliform.
    - Flowers pedunculate, peduncles 1 cm. long. 21. *C. Mississippiensis.*
    - Flowers nearly or quite sessile.
      - Stipules linear, scarious, 15. *C. calycioides.*
      - Stipules lanceolate, striated. 22. *C. nictitans.*
- Plants hispid or pubescent.
  - Flowers more than 2–5 cm. broad.
    - Leaflets small, cinereous, 25. *C. cinerea.*
    - Leaflets large, glabrate, 20. *C. Chamæcrista robusta.*
  - Flowers less than 2–5 cm. broad.
    - Legumes geminate, hispid, 23. *C. aspera.*
    - Legumes not geminate.

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|---|---|
| Leaflets tipped with a rigid acuminate point, | 26. *C. Simpsoni.* |
| Leaflets acutely subfalcate, | 24. *C. procumbens.* |

## SUBGENUS I. FISTULA.

Unrepresented in the United States.

## SUBGENUS II. SENNA.

Herbs or shrubs, rarely trees. Petiolar gland when present more or less prominent, subglobose, oblong or slender, and stipitate. Flowers in racemes, which often become paniculate or corymbose, usually terminating the younger branches. Stamens 10, the three upper and occasionally a lower one reduced to staminodia; anthers oblong, truncate or more often rostrate at apex, dehiscent by 1 or 2 terminal pores or chinks; base obtuse, more or less bilobed. Legume of variable shape, dehiscent along one or both sutures, more rarely indehiscent; valves inelastic. Ovules funiculate, longitudinal or transverse.

### Section A. CHAMÆFISTULA.

Our species all herbs. Leaves inter-glandulose or eglandulose. Perfect stamens 7, staminodia 3. Legume terete, turgid or compressed, usually dehiscent along dorsal suture, more rarely along both sutures. Ovules transverse, separated by septa.

Series *Bacillares*, *Corymbosæ* and *Excelsæ* unrepresented in the the United States.

### Series *Brachycarpæ*.

Leaves 2-many-foliolate. Anthers equal, or the 2–3 inferior longer, subrostrate. Legume short, curved or sometimes straight, turgid, submembranaceous, bivalvate. Racemes few-flowered, or when many-flowered becoming corymbose-paniculate.

1. Herbs with perennial rhizome; leaves 2-foliolate.

### 1. CASSIA RŒMERIANA Scheele.

*Cassia Rœmeriana* Scheele, Linnæa, **21**: 457 (1848).

Plant of medium height, clothed with closely appressed pubescence, sending up several–many stems from the thick, knotty rhizome; leaflets densely pilose, lance-linear, 3–6 cm. long, .75–-1.2 cm. wide, asymmetrical at base, borne on a somewhat elongated rhachis; stipules filiform, persistent; petiolar gland slender, conical, situated between lowermost pair of leaflets; peduncles 2-4 flowered, forming terminal corymbose racemes; sepals ovate, membranaceous; petals strongly veined; legume nearly straight, turgid, mucronate, dehiscent along both sutures; dorsal suture prominent; length 2.5-3 cm., width .5 cm.; seeds numerous.

Texas and New Mexico, extending south into Mexico.

### 2. Cassia pumilio A. Gray.

*Cassia pumilio* A. Gray, Bost. Journ. Nat. Hist. **6**: 180 (1850).

Plant low (8-15 cm.), with tufted stems from the long, branching rhizome; stems and leaves sparsely pubescent; leaflets linear, or the earliest obovate (3-3.5 cm. long, 2 cm. wide), slightly shorter than the elongated rhachis; petiolar gland slender, setaceous, situated between lowermost pair of leaflets; stipules acute, linear, membranaceous, persistent; flowers resembling those of *C. Rœmeriana,* but solitary on elongated axillary peducles; calyx persistent; sepals slighty shorter than petals; legume turgid, oval, truncate, finely pubescent; length 1.5 cm., width 7 cm.

West Texas and New Mexico, extending south into Mexico.

### 3. Cassia bauhinioides A. Gray.

*Cassia bauhinioides* A. Gray, Bost. Journ. Nat. Hist. **6**: 180 (1850).

Plant of medium height, somewhat branching, densely pubescent, pilose or even tomentose; leaflets oblong-ovate, very asymmetrical at base, canescent beneath, 2-3 cm. long, 1-1.5 cm. wide; petiolar gland setaceous, situated on rhachis just below lowermost pair of leaflets; stipules filiform, persistent; peduncles two-flowered, forming corymbs at the ends of the branches; sepals thin, membranaceous, elliptical; legume villous, compressed, straight or subfalcate, acute, dehiscent along both sutures; length 3-5 cm., width 5 cm.; seeds numerous.

The leaflets are apt to vary in shape and size; in seedling specimens they are nearly orbicular, but later pass into the narrow form.

West Texas, New Mexico and Arizona, extending south into Mexico.

### 4. Cassia crotalarioides Kunth.

*Cassia crotalarioides* Kunth, Mimos. 132, *t. 40.* (1819-24.)

Fruticose at base, branching freely; stems and leaves pubescent; leaves 2–3 foliolate, the leaflets all borne near termination of rhachis; leaflets ovate-elliptical, slightly asymmetrical at base, densely pubescent, acute or obtuse, 2–2.25 cm. long, .7–1 cm. wide; petiolar gland setaceous, situated between lowermost pair of leaflets; stipules long, filiform; inflorescence a corymbose raceme, many-flowered; petals large, conspicuous; sepals smaller, lanceolate; legume turgid, slightly compressed, oblong-oval, (1.75 cm. long, .75 cm. wide,) sparsely pubescent; dorsal suture straight, mucronate-tipped; ventral suture more or less curved; seeds few.

Arizona.—Grand Cañon, Colorado Plateau, Moseley (1884). Kew Herb.; Mexico.

No specimen collected within the boundary limits of the United States exists in the Columbia College Herbarium; but the locality given above, in which it was found by Prof. Moseley when collecting for the Kew Herbarium, leads us to suppose that it occurs in other portions of Arizona and New Mexico.

### 5. CASSIA COVESII A. Gray.

*Cassia Covesii* A Gray, Proc. Am. Acad. 7: 399 (1868.)

Stems branching from the base; plant thickly clothed with finely appressed, silky pubescence; leaves 2–3 foliolate; leaflets asymmetrical at base, ovate or oblong-elliptical, mucronate, 2.5–3 cm. long, 1.2 cm. wide; petiolar gland setaceous, situated between lowermost pair of leaflets; occasionally an accessory gland of similar appearance is present between second pair; stipules filiform, persistent; racemes numerous, axillary, many-flowered; flowers large; sepals small, ovate-elliptical; legume subterete, acute, many seeded, straight or subfalcate, 3.5 cm. long, 6 cm. wide.

This species is not included in Bentham's monograph. The two specimens in the Columbia Herbarium differ in the degree of pubescence.

Nevada and Southern California extending through Arizona south into Mexico.

### 6. CASSIA LINDHEIMERIANA Scheele.

*Cassia Lindheimeriana* Scheele, Linnæa, **21**: 457 (1848).

Plant of medium height, branching, silky-pubescent; leaves 4–6-foliolate; leaflets asymmetrical, oval or elliptical, acute or mucronate, white-tomentose beneath, 2.7–3 cm. long, 1.5 cm. wide; petiolar gland setaceous, situated between the next to the lowermost pair of leaflets; stipules linear, membranaceous; racemes loosely many-flowered, becoming corymbose at terminations of branches; sepals ovate-lanceolate, striated; legume straight, acute, apparently indehiscent, subglabrous, very much compressed, 5 cm. long, .5 cm. wide; seeds numerous.

Texas, New Mexico and Arizona, extending south into Mexico.

### Section B. ONCOLOBIUM.

Shrubs or herbs. Perfect stamens 7, staminodia 3. Legume turgid or compressed, often arcuate, dehiscent along both sutures, variable in length.

1. Leaves 4–8 foliolate, sharply acuminate; legume linear, elongated.

### 7. CASSIA LEPTOCARPA Benth.

*Cassia leptocarpa* Benth. Linnæa, **22**: 528 (1849).

Fruticose or suffruticose, tall, branching, pubescent, leaves 5–7 foliolate; leaflets acuminate, lanceolate, basally symmetrical, densely pubescent, 5–6 cm. long, 1.5–1.8 cm. wide; petiolar gland large, sessile, obconical; stipules lanceolate, foliaceous, caducous; inflorescence in short axillary racemes; calyx corolla-like, the oval sepals not surpassing the petals; legume narrowly linear, subglabrous, with prominent sutures, 20–25 cm. long, .3 cm. wide; seeds very numerous, quadrilaterally compressed.

New Mexico and Arizona, extending south into Mexico.

### 8. CASSIA OCCIDENTALIS L.

*Cassia occidentalis* L. Sp. Pl. 539 (1733).

Tall, annual, herbaceous, glabrous; leaves 4–6 foliolate; leaflets lanceolate, becoming lance-elliptical, subglaucous beneath, 3.6–5 cm. long, 1–2 cm. wide; petiolar glands 2, sessile, conical, situated between lowermost pair of leaflets; stipules filiform, caducous; flowers large, in closely-crowded axillary racemes; sepals rather short, oval or lance-ovate; legume linear, turgid, slightly compressed, glabrous, straight, or arcuate, the sypta externally prominent, 11 cm. long, 6 cm. wide; seeds numerous, parallel with the transverse septa.

Virginia and Southern Indiana, southward into Mexico. (Adventive or naturalized from Tropical America.)

### 9. CASSIA LIGUSTRINA L.

*Cassia ligustrina* L. Sp. Pl. 541 (1753.)

Herbaceous, glabrous; stem with prominent longitudinal ridges; leaves 6–8-foliolate; leaflets lanceolate, glabrous, 4–4.2 cm. long, 1 cm. wide; petiolar gland at base of rhachis, elongated, stipitate; stipules linear, membranaceous, caducous; racemes few-flowered, forming a corymbose panicle; sepals oval, membranaceous, shorter than the petals; legume flat, glabrous, with slightly sinuate sutural margins, 8 cm. long, .6 cm. wide; seeds parallel with the valves.

Florida, extending south into the West Indies and widely distributed in Tropical America.

### 10. CASSIA MARYLANDICA L.

*Cassia Marylandica* L. Sp. Pl. 541 (1753).

Tall, branching, herbaceous, glabrous; leaves 6–9-foliolate; leaflets acute-elliptical, submucronate, glaucous beneath, slightly asymmetrical at base, 4–5 cm. long, 1.4 cm. wide; petiolar gland obconical, stipitate, situated a short distance above base of rhachis; stipules filiform, ciliate, caducous; racemes short, many-flowered; sepals oval, more or less petal-like; legume falcate, flat, linear, somewhat hispid, with septal constrictions forming undulate sutural margins, 10–12 cm. long, .6 cm. wide.

Southern Connecticut, extending south to Florida and west to Nebraska, Kansas and Louisiana.

## Section C. PROSOSPERMA.

Shrubs or herbs. Perfect stamens 6 or 7; staminodia 3. Legume linear, tetragonal, straight or curved, dehiscent along both sutures.

### Series *Toræ.*

Peduncles short, 1–2 flowered; leaves 2–3 foliolate.

### 11. CASSIA TORA L.

*Cassia Tora* L. Sp. Pl. 538 (1753).

Tall, glabrous, herbaceous; leaves 2–3-foliolate, glabrous or pubescent beneath; leaflets obovate-elliptical or wedge-obovate, very slightly cuspidate, the terminal pair much the largest, all symmetrical or nearly so at base, 3–5 cm. long, 2.5 cm. wide; petiolar glands slender, elongated, situated between lowermost pair of leaflets; stipules long, linear, persistent; racemes loose, few-flowered; flowers large; sepals oval, membranaceous; legume long, linear, acute, falcate, more or less tetragonal, glabrous, 16–18 cm. long, .3 cm. wide; seeds numerous, large, quadrilaterally compressed.

Southern Virginia, extending south to Florida and Cuba, west to Southern Indiana and Arkansas. Also in Tropical America.

Series *Confertæ*, *Laxifloræ* and *Coriaceæ* unrepresented in the United States.

### Section D. CHAMÆSENNA.

Shrubs or rarely herbs. Perfect stamens 7 (rarely 6), staminodia 3. Legume compressed, dehiscent by both sutures. Seeds transverse or oblique.

A. *Leaves interglandulose, or glands sometimes wanting.*

### Series *Pachycarpæ.*

Leaves few–many-foliolate; stipules setaceous or caducous; legume usually with convex valves.

### 12. CASSIA BAHAMENSIS Mill.

*Cassia Bahamensis* Mill. Gard. Dict. Ed. 8, No. 9 (1768).

Fruticose, tall, glabrous, or somewhat pilose; leaves 3–5-foliolate, subcoriaceous; leaflets ovate or acutely elliptical, submucronate, 3.5–5 cm. long, 1.6 cm. wide; petiolar gland orbicular, depressed, varying in position from between lowermost pair of leaflets to near base of rhachis; stipules linear, caducous; inflorescence corymbose-paniculate; sepals petal-like; legume linear, flat, with lateral depressions between the seeds, 9 cm. long, .5 cm. wide.

Florida, extending into the Bahamas.

Series *Aphyllæ* unrepresented in the United States.

### Series *Rostratæ.*

Anthers of 2–3 lower stamens terminated by a cylindrical, pore-bearing beak. Legume generally narrow, with planular valves. Leaflets few to many, obtuse, or rarely becoming acute. Stipules linear, setaceous or caducous. Peduncles 1–2-flowered, rarely 3–4-flowered.

### 13. CASSIA BIFLORA L.

*Cassia biflora* L. Sp. Pl. 540 (1753).

Fruticose, branching; stem glabrous or pilose; leaves 4–10-foliolate, usually pubescent or canescent beneath, sometimes glabrous; leaflets oblong-elliptical, acute or obtuse at apex, 4 cm. long, 1.6 cm. wide; petiolar gland stipitate, slender, acute, situated between lowermost pair of leaflets; stipules linear, membranaceous, caducous; peduncles 2-flowered, in close terminal racemes; flowers large; sepals oblong-elliptical, equal in length with petals; legume falcate, narrowly linear, 9 cm. long, .5 cm. wide.

Florida, extending into the West Indies; also in Mexico.

Series *Auriculatæ* unrepresented in the United States.

B. *Leaves eglandulose.*

### Series *Floridæ*.

Racemes axillary or corymbose-paniculate. Legume with flat valves, usually elongated.

### 14. CASSIA WISLIZENI A. Gray.

*Cassia Wislizeni* A. Gray, Pl. Wright, 1: 60 (1852).

Fruticose, branching; leaves small, glabrous, 4–7 foliolate; leaflets wedge-obovate or oblong-oval, slightly acuminate, 5 mm. long, 3 mm. wide; petiolar gland minute or wanting; stipules aculeate; inflorescence in crowded paniculate racemes, becoming corymbose at terminations of branches; flowers large and conspicuous; legume flat, elongated, with prominent sutures, 9 cm. long, .7 cm. wide; seeds numerous, transverse, causing external swellings on valves.

West Texas and New Mexico, extending south into Mexico.

Series *Pictæ* and *Brachycarpæ* unrepresented in the United States.

Section PSILORHEGMA unrepresented in the United States.

## SUBGENUS III. LASIORHEGMA.

Shrubs or herbs, rarely trees. Petiolar glands when present depressed, scutelliform, sessile or stipitate. Stamens 10, all perfect, rarely several wanting or reduced to staminodia; filaments short, anthers oblong-linear, dehiscent by short slits at the apex, more rarely laterally. Legume usually flat, the valves elastic, ventrally and dorsally dehiscent. Seeds transverse or oblique.

Sections APOUCOUITA and ABSUS unrepresented in the United States.

### Section CHAMÆCRISTA.

Flowers usually solitary on axillary peduncles. Anthers often unequal.

#### Subsection *Xerocalyx*.

Sepals subscarious, many-striate. Leaves 1-many-foliolate.

### 15. CASSIA CALYCIOIDES D.C.

*Cassia calycioides* D.C. Prod. **2**: 503 (1825).

Low, spreading, herbaceous, more or less pilose; leaves 6–15-foliolate, glabrous or subpilose; leaflets linear, finely acuminate, .7 cm. long, .15 cm. wide; petiolar gland slender, cupuliform, stipitate; stipules linear, scarious, persistent; flowers small, solitary on very short axillary peduncles; legume linear, acuminate, pubescent, 4–4.5 cm. long, 5 cm. wide.

Texas, New Mexico and Arizona, extending south into Mexico.

### Subsection *Leiocalyx.*

Sepals membranaceous, scarcely striate.

Series *Subaphyllæ* and *Prostratæ* unrepresented in the United States.

### Series *Paucijugæ.*

Shrubs or perennial herbs, erect or spreading; leaves 3–7-foliolate, subcoriaceous; petiolar gland small, slightly stipitate.

### 16. CASSIA WRIGHTII A. Gray.

*Cassia Wrightii* A. Gray, Pl. Wright, **2**: 50. (1853).

Low, branching, herbaceous or suffruticose at base; leaves glabrous, membranaceous, 4–8-foliolate; leaflets elliptical, obtuse or submucronate, .7 cm. long, .2 cm. wide; rhachis short; petiolar gland very small, cupuliform, substipitate; stipules lanceolate; peduncles 1-flowered; flowers large; legume glabrous, linear, acute, 4 cm. long, .5 cm. wide; seeds numerous, oblique.

New Mexico and Arizona, extending south into Mexico.

### 17. CASSIA GRAMMICA Spreng.

*Cassia grammica* Spreng. Neue Entd. **3**: 55 (1822).

Low, branching, herbaceous or suffruticose at base, densely pubescent; leaves 4–6-foliolate; leaflets elliptical or sub-obovate, mucronate, subcoriaceous, canescent beneath, 1 cm. long, .3 cm. wide; petiolar gland obsolescent, sessile, compressed; stipules aculeate; peduncles 1-flowered; flower large; legume pubescent, linear, mucronate; length (in young specimen) 3 cm., width .4 cm.; seeds few, oblique.

Florida, extending south into Cuba.

Series *Coriaceæ* unrepresented in the United States.

### Series *Subcoriaceæ.*

Shrubs or perennial herbs, erect; leaves 3–10-foliolate, obtuse, subcoriaceous; petiolar gland sessile; stipules small.

### 18. CASSIA GREGGII A. Gray.

*Cassia Greggii* A. Gray, Pl. Wright, 1 : 59 (1852).

Fruticose, glabrous; leaves 3–5-foliolate; leaflets oblong-oval, slightly truncate, 1 cm. long, 4 cm. wide; nerves prominent; petiolar gland compressed, minute; stipules filiform, often caducous; peduncles 1-flowered; legume not observed.

This species occurs in South Texas, according to Bentham's statement (Monograph, p. 575); but all the specimens which I have examined were collected in Mexico.

## Series *Chamæcristæ veræ*.

Herbaceous or suffruticose; leaves 8–20-foliolate, membranaceous; petiolar gland sessile or stipitate; stipules small; legume flat.

### 19. CASSIA CHAMÆCRISTA L.

*Cassia Chamæcrista* L. Sp. Pl. 542 (1753).

Tall, herbaceous, glabrous; leaves 8–12-foliolate; leaflets oblong-elliptical, acute or mucronate, 1.5 cm. long, 3 cm. wide; petiolar gland sessile, comprsssed, cupuliform; stipules lance-linear, membranaceous; peduncles numerous, supra-axillary, 3–5-flowered; flowers large; sepals membranaceous, lanceolate, equalling or exceeding the petals; legume elongated-linear, subrostrate, pubescent, 5 cm. long, .5 cm. wide; seeds numerous, transverse.

Maine, extending south to Florida and west to Minnesota, Kansas and Mexico.

### 20. CASSIA CHAMÆCRISTA ROBUSTA, n. var.

Tall, branching, herbaceous; stems densely pubescent, stout; leaves glabrate, 10–15-foliolate; leaflets elliptical, basally asymmetrical, obtuse, finely cuspidate, 2 cm. long, .5–.6 cm. wide, occasionally an odd one terminating the rhachis; petiolar gland circular, truncate, compressed, sessile; stipules foliaceous, broadly lanceolate, striated; peduncles 1–3-flowered, supra-axillary, flowers large and conspicuous, red or orange-red; sepals small, membranaceous, lanceolate, only half as long as the petals; stamens 10, 5 larger, 5 smaller, perfect; legume narrow, linear, pubescent, 4 cm. long, .5 cm. wide.

Type a single specimen in the Columbia College Herbarium collected by Dr. C. W. Short in the mountains of Kentucky, and referred by him with doubt to *C. aspera*, with which, however, it has almost nothing in common.

### 21. CASSIA MISSISSIPPIENSIS n. sp.

Low, branching, suffruticose,; stem terete, glabrous; leaves subcoriaceous, pubescent, 8–14-foliolate; leaflets small, elliptical or obovate, mucronate, basally asymmetrical, 5 cm. long, .1–.15 cm. wide; secondary nerves 3 or 4, opposite, rarely alternate; petiolar gland minute, cupuliform, sessile, situated midway between lowermost pair of leaflets and base of rhachis; stipules acutely linear, membranaceous, persistent; peduncles 1 cm. long, axillary, 1-flowered; flower large (petals 1 cm. long, .3 cm. wide); anthers 10, rostrate, all perfect, the lower 5 larger, yellow, the upper smaller and reddish; anther-sacs dehiscent by terminal pores; sepals lance-linear, slightly pubescent, not surpassing the petals; legume turgid, linear, sparsely pubescent, ventrally and dorsally dehiscent, elastic; length 2.5 cm., width 4 cm.; seeds 4 or 5, ovoid, rather large (longest diam. 3 mm.) transverse.

Type in herbarium of Columbia College, collected by Miss K. Skeehan, 1889, at Ocean Springs, Mississippi.

The specific characters are well-marked, the only *Cassia* to which it bears any resemblance being *C. pygmæa* D.C., a Cuban species, and not reported, so far as I know, from any of the States. *C. pygmæa* may be distinguished by its dense hirsute pubescence, its oblique seeds and fewer pinnæ on the rhachis. The two plants in general external appearance are quite similar.

### 22. CASSIA NICTITANS L.

*Cassia nictitans* L. Sp. Pl. 543 (1753.)

Low, herbaceous, branching and spreading freely; leaves glabrous, 6–14-foliolate; leaflets linear-elliptical, acute or mucronate, 1–1 4 cm. long, .2–.3 cm. wide; petiolar gland urceolate, subsessile; stipules small, foliaceous, lanceolate, striated; peduncles 1-flowered, supra axillary; flowers small, inconspicuous, subsessile; legume pubescent, submembranaceous, acute, 3.5 cm. long, .6 cm. wide ; seeds few, oblique.

Southern New England, extending south to Florida, and west to Indiana, Kansas and Louisiana.

### 23. CASSIA ASPERA Muhl.

*Cassia aspera* Muhl; Ell. Bot. S. Car. & Georg. 1: 474 (1821).

Tall, erect, herbaceous; stem hispid with fulvous hairs; leaves 20–24-foliolate, glabrous; leaflets narrowly linear, acuminate, 1 cm. long, .15 cm. wide; petiolar gland slender, erect, elongated; stipules linear, membranaceous, striated; peduncles 2–3-flowered, supra-axillary, very short; flowers rather larger than in *nictitans;* legumes usually in pairs, hispid, somewhat obtusely linear, 2.8 cm. long, .6 cm. wide; seeds few, oblique.

Florida—Jacksonville, Curtiss; Key West, Blodgett.

It seems to be the result of carelessness on Bentham's part that he has inserted *C. aspera* Muhl. as a synomyn of *C. nictitans* L. Even if the differences were not sufficiently well marked to warrant the establishment of a species, there could be no doubt whatever that they constituted a varietal distinction. But *aspera* has hispid stems, while *nictitans* is glabrous; the petiolar gland in the one case is slender and elongated, in the other urceolate, subsessile; *aspera* produces pods in pairs, while *nictitans* does not.

*C. aspera* bears a much closer resemblance to the Cuban *C. patellaria* D.C. than it does to *nictitans;* and the differences are harder to detect. In *patellaria,* however, the venation is radically different, the costa adjoining the superior margin of the leaflets, while in *aspera* it occupies very nearly a medial position. *C. patellaria* is downy-pubescent, not hispid, the flowers are smaller and sessile.

### 24. CASSIA PROCUMBENS L.

*Cassia procumbens* L. Sp. Pl. 543 (1753).

Prostrate, branching from a fruticose base; leaves 18–24-foliolate, pubescent; leaflets very small, linear, acutely subfalcate, .5 cm. long, .1 cm. wide, on a stout rhachis; petiolar gland minute, situated midway between the lowermost pair of leaflets and base of rhachis; stipules cordate, foliaceous; peduncles rather long, 1-flowered, axillary; flower large; legume linear, puberulent, somewhat crisped, with prominent sutural margins, length 3.5 cm., width .4 cm.

Texas—Nealley (1889), extending south into Mexico.

## Series *Dimidiatæ.*

Suffruticose or herbaceous, procumbent, rarely erect; leaves 8–30-foliolate, narrow, acute; costa approximating superior margin or coalescing with it.

### 25. CASSIA CINEREA Cham. & Schlecht.

*Cassia cinerea* Cham. & Schlecht. Linnæa 5: 599 (1830).

Suffruticose, branching, puberulent; leaves 10–20-foliolate, clothed with cinerous pubescence; leaflets narrow, linear-falcate, acute, 1 cm. long, .2 cm. wide; petiolar gland small, cupuliform, stipitate; stipules filiform or linear; peduncles 1–2-flowered, rather short, axillary or supra-axillary; flowers large; legume linear, pilose or sparsely pubescent, rostrate, somewhat elongated, 5–5.5 cm. long, .5 cm. wide, seeds oblique.

Texas (Drummond)—extending south into Mexico.

### 26. CASSIA SIMPSONI n. sp.

Low, branching from a fruticose base; stem more or less puberulent; leaves 8–12-foliolate; leaflets glabrous or subglabrous, small, narrowly linear (5 mm. long, 1 mm. wide), tipped with a black, rigid, acuminate point; costa approaching the superior margin; secondaries 4 to 5, oblique, almost parallel with the costa; petiolar gland minute, stipitate, obconical, situated on rhachis just below lowermost pair of leaflets; stipules foliaceous, tipped with rigid acuminate points similar to those on leaflets; flowers sessile or subsessile, somewhat supra-axillary, .5–.8 cm. broad; sepals lanceolate, membranaceous, equalling the petals; legume flat, linear, hirsute, subrostrate, 2 cm. long, .4–.5 cm. wide; seeds few, oblique.

Florida—Big Pine Key, Simpson (May, 1891), No. 174.

Type, three specimens in the National Herbarium, collected by Mr. J. H. Simpson, to whom the species is dedicated. One of these specimens is an entire plant, measuring 21 cm. in height, of very compact, shrubby form. The most prominent specific characteristic is the rigid acuminate point terminating the apices of the leaflets and stipules, a feature not observed in any other *Cassia*.

### 27. CASSIA ARMATA S. Wats.

*Cassia armata* S. Wats. Proc. Am. Acad. 11: 136 (1876).

Herbaceous, puberulent; leaves with an elongated, flattened, spinulose rhachis 4–6 cm. long, often impari-pinnate, 2–7-foliolate; leaflets distributed at irregular intervals on rhachis, alternate or opposite, ovate or sometimes crescentic in outline, subcoriaceous, .5 cm. long, .3 cm. wide; petiolar gland and stipules wholly wanting; flowers rather large, numerous in elongated axillary racemes; pedicels slender, subtended by rigid aculeate bracts; perfect stamens 7, staminodia 3; mature legume not observed.

Nevada—Wheeler (1872).

California—Palmer (1876); San Diego, Orcutt (1889).

Arizona—Mohave Desert, Mr. and Mrs. Lemmon (1884).

In none of the specimens in the Columbia College Herbarium, or those in the Department of Agriculture, are mature pods represented. The young pod, according to Watson's description, is "stipitate glabrate, linear, acuminate, compressed, the sutures thick and nerve-like," a set of characters that might be applied to almost any *Cassia.* The two detached pods on a sheet in the Department of Agriculture Herbarium, collected by Wheeler in Nevada, apparently do not belong to the genus at all, but as Mr. Coville has remarked, seem to be those of *Acacia Greggii.*

Until this odd species can be more carefully examined, it has been thought best not to include it in the regular sequence. While belonging to the subgenus *Senna,* it is not referable to any of Bentham's sections.

## Steps toward a Revision of the linosporous Species of North American graminicolous Hypocreaceæ.

By Geo. F. Atkinson.

Certain of the linosporous species of Hypocreaceæ present such a similarity in the character of the asci and spores that some uncertainty seems to exist regarding the generic relationship. This has led to the incorporation of some species under the same genus without regard to certain well-defined and important differential characters of the stroma. In the study of several species collected in Alabama my attention has been called to these peculiarities, and this step toward a revision of the species is offered here as a contribution upon the subject.

The genus *Epichloë* Fr. is here restricted to those characters of the stroma of which *E. typhina* is the type.

The genus *Hypocrella* was erected by Saccardo to include species with quite a variety of stroma but which in contradistinction from *Epichloë* was disciform, and did not surround the host, or substratum, as *E. typhina* does. The new genus *Dothichloë* is here proposed for those species of *Hypocrella* which possess a dothidiaceous stroma and are represented by forms like *Epichloë Hypoxylon* Pk.

*Hypocrea tuberiformis* B. & Rav. with linear spores is made the type of another genus, for which the name *Echinodothis* is proposed.